

The Antarctic Search for Meteorites: The Future of Space, on Earth Today

EVA Knowledge Capture Outbrief

Stan Love
2013 May 6



A months-long expedition

A months-long expedition
Far from home

A months-long expedition
Far from home
With a lethal outside environment,

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Far from home
With a lethal outside environment,
Living in cramped quarters

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Living in cramped quarters
With a small group of international co-workers

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With little contact with friends and family,

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Plus long work days

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Far from home
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Living in cramped quarters
With a small group of international co-workers
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Plus long work days
And challenges with eating, drinking,

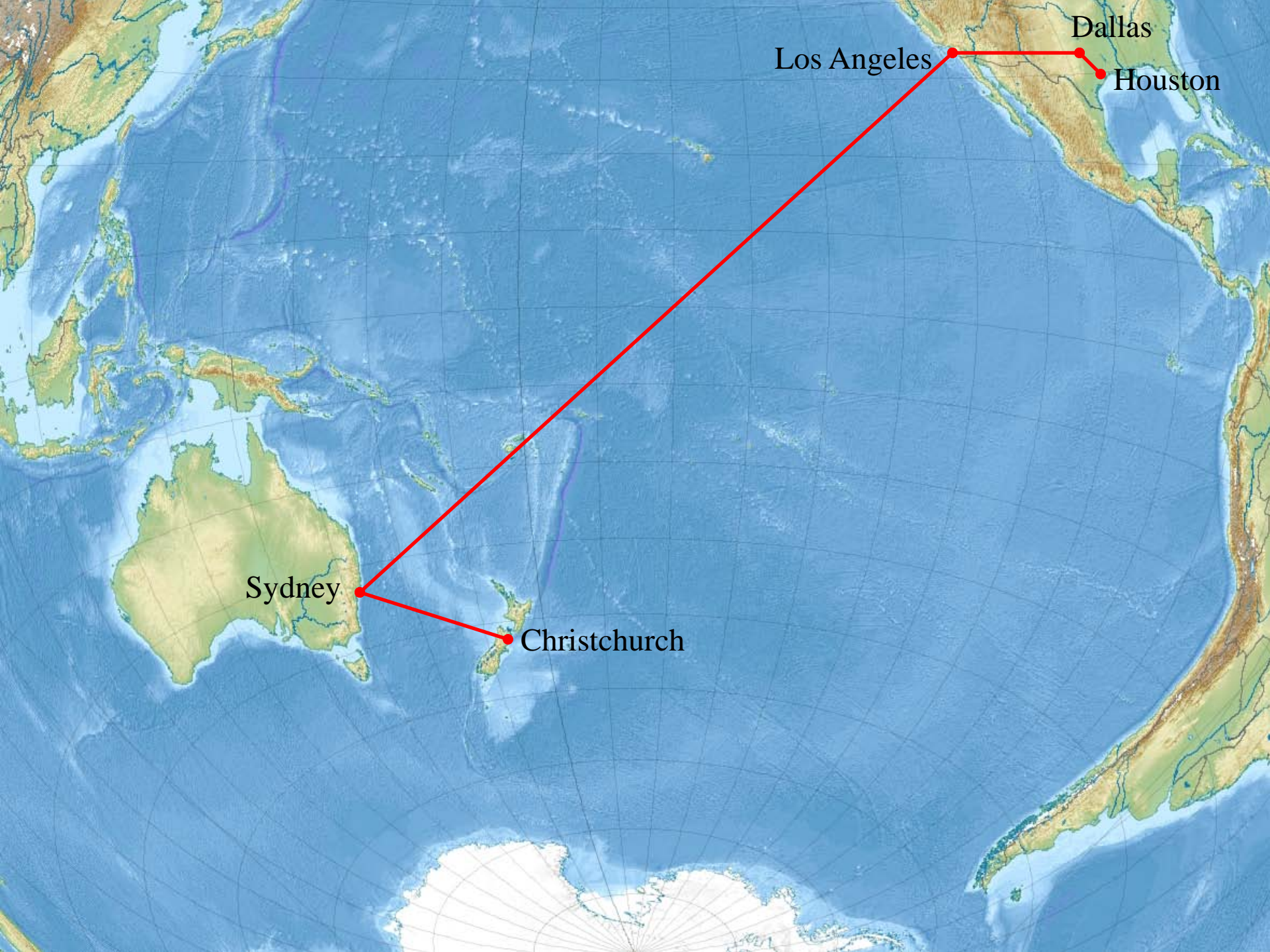
A months-long expedition
Far from home
With a lethal outside environment,

Living in cramped quarters
With a small group of international co-workers
Isolated from the rest of the world
With little contact with friends and family,

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And challenges with eating, drinking,
And going to the bathroom.







Los Angeles

Dallas

Houston

Sydney

Christchurch





Christchurch

McMurdo Station







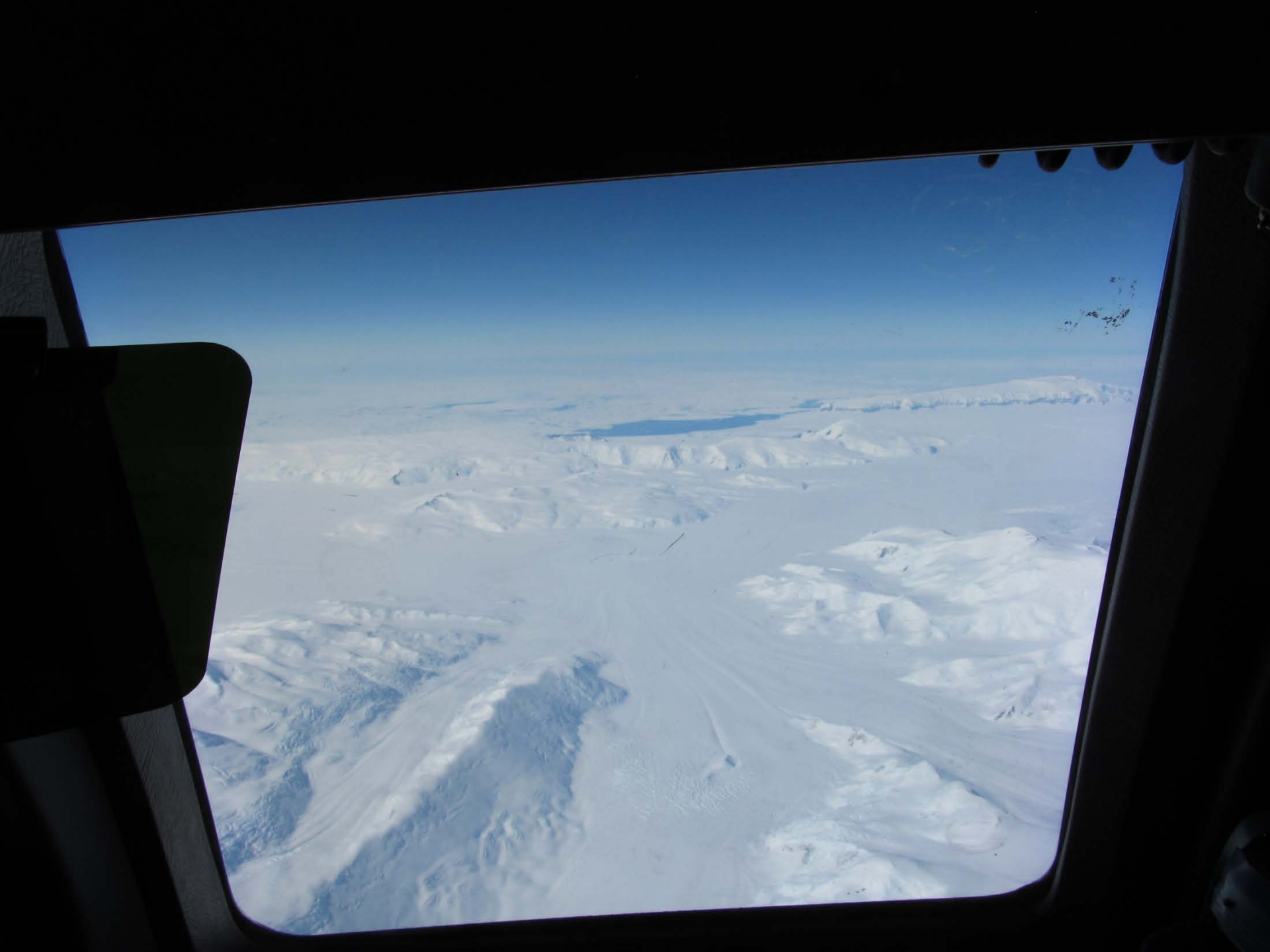
U.S. AIR FORCE
LIQUID OXYGEN
NO SMOKING WITHIN 50 FEET
KEEP FREE FROM OIL AND GREASE
FOR BREATHING PURPOSES ONLY



BOC
A Flammable Prohibitive
Maintenance Inspection
was carried out on this
installation.















McMurdo Station

900 people (150-200 in winter)

5:1 ratio of support staff to scientists

3:1 ratio of males to females

14,000 liters of water per day
(desalinated seawater)

1.7 MW average electrical load
(90% diesel, 10% wind)



IVAN THE
TERRA BUS

FOREMOST

FUEL TANK
JPG

FOR
OTHER
SAC















007







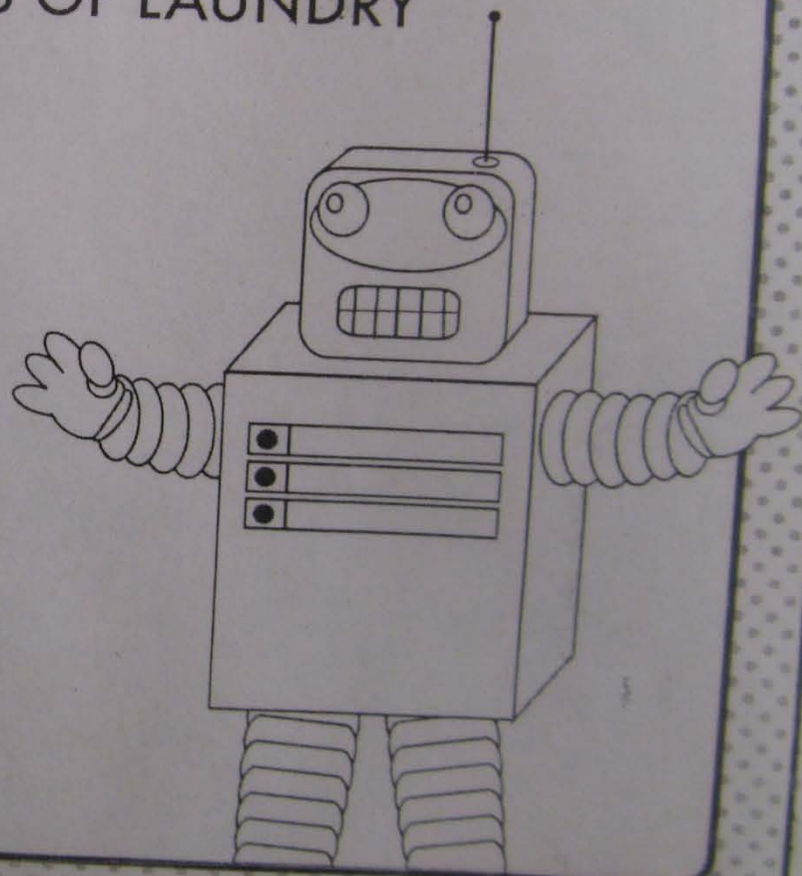
ROBOT SAYS:

USE HOT WATER SPARINGLY!

FOR SHOWERS & HOT CYCLES OF LAUNDRY

SADLY, THIS BUILDING HAS MORE
HUMANIDS THAN HOT WATER.
PLEASE USE HOT WATER IN OFF-
PEAK HOURS, LIMIT HOW OFTEN
YOU USE HOT CYCLES, & KEEP
SHOWERS SHORT SO YOUR FRIEND
DOES NOT GET STRANDED IN A
COLD SHOWER!

IN THE FUTURE,
CONSERVE HOT WATER!



McM Electric Bill

Current \$ 6693/ Day

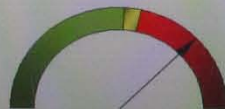
Last wk avg. \$ 6441/ Day

Power Usage Last Week
kWh



281786 kWh

Water Usage Last Week
Gallons per Person



57
Gal/person/Day

Wind Energy Last Week
kWh



33631 kWh

Heat Recovery Last Week
MBTU



793222 MBTU

HOUSING

STATION POPULATION

942

As of: 12/2/12

MALE TO FEMALE RATIO



DID YOU KNOW?

Peanuts are
one of the
ingredients
in Dynamite!

MO

Gallagh
CLOS

COP

Always

GEAR

Go

CRAFT

Respect

LIBR

6:30

Like Us On
facebook



Monday, Wedne





PM-3A NUCLEAR POWER PLANT

AUTHORIZED AND FUNDED BY THE U.S. CONGRESS AUGUST 1960

DESIGNED AND FABRICATED BY MARTIN COMPANY UNDER
CONTRACT TO THE ATOMIC ENERGY COMMISSION

ERECTED BY NAVY SEABEES JANUARY/FEBRUARY 1962

FIRST CRITICALITY 4 MARCH 1962

OPERATED AND MAINTAINED BY OFFICERS, SEABEES AND
HOSPITAL CORPSMEN OF THE NAVAL NUCLEAR POWER UNIT,
FORT BELVOIR, VIRGINIA

CREWS WERE AUGMENTED WITH ARMY AND AIR FORCE
PERSONNEL

THE PLANT WAS SHUT DOWN IN SEPTEMBER 1972

IN MAY 1979, PM-3A DECOMMISSIONING WAS COMPLETE, AND THE
SITE RELEASED FOR UNRESTRICTED USE

POWER OUTPUT: 1800 KW(ELECTRIC)
EXPORT STEAM FOR DESALINATION PLANT
72% AVAILABILITY; RECORD POWER RUN 4400 HOURS 1971
ONLY NUCLEAR POWER PLANT TO HAVE OPERATED IN ANTARCTICA

ERECTED IN 2010 BY THE NAVAL NUCLEAR POWER UNIT GROUP











FRY'S
PURE
CONCENTRATED
COCOA
12. LBS. TINS. No. 227.

BOVRIL

HARVEY'S
FINEST
OATMEAL
EDINBURGH

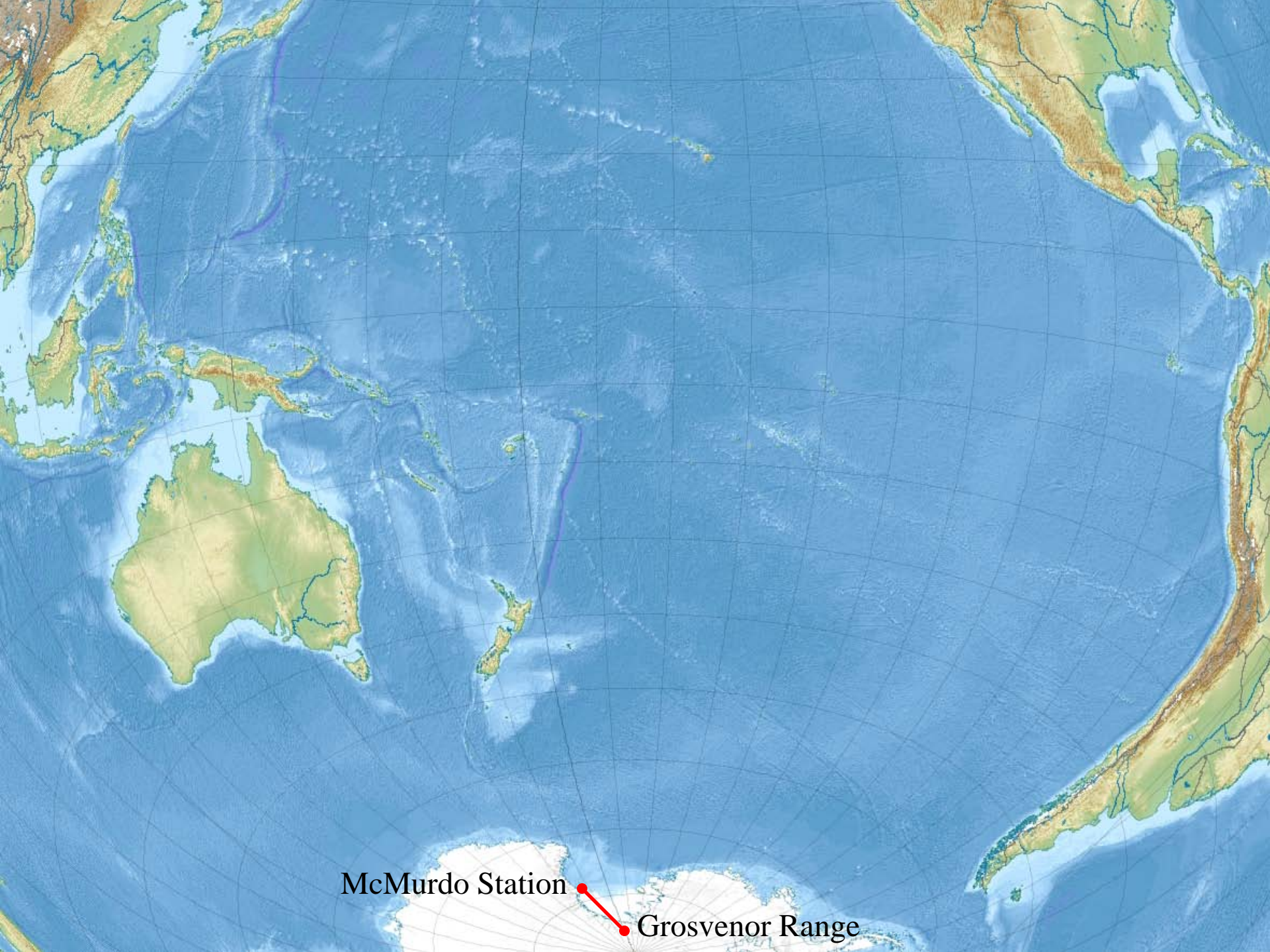
BISCUITS
SPECIAL CAKE
22 LBS.

SCOTT'S ANTARCTIC
FOOD

MEAL

SCOTT'S ANTARCTIC
FOOD





McMurdo Station

Grosvenor Range



LC-130 "Hercules" aircraft

280 kt TAS

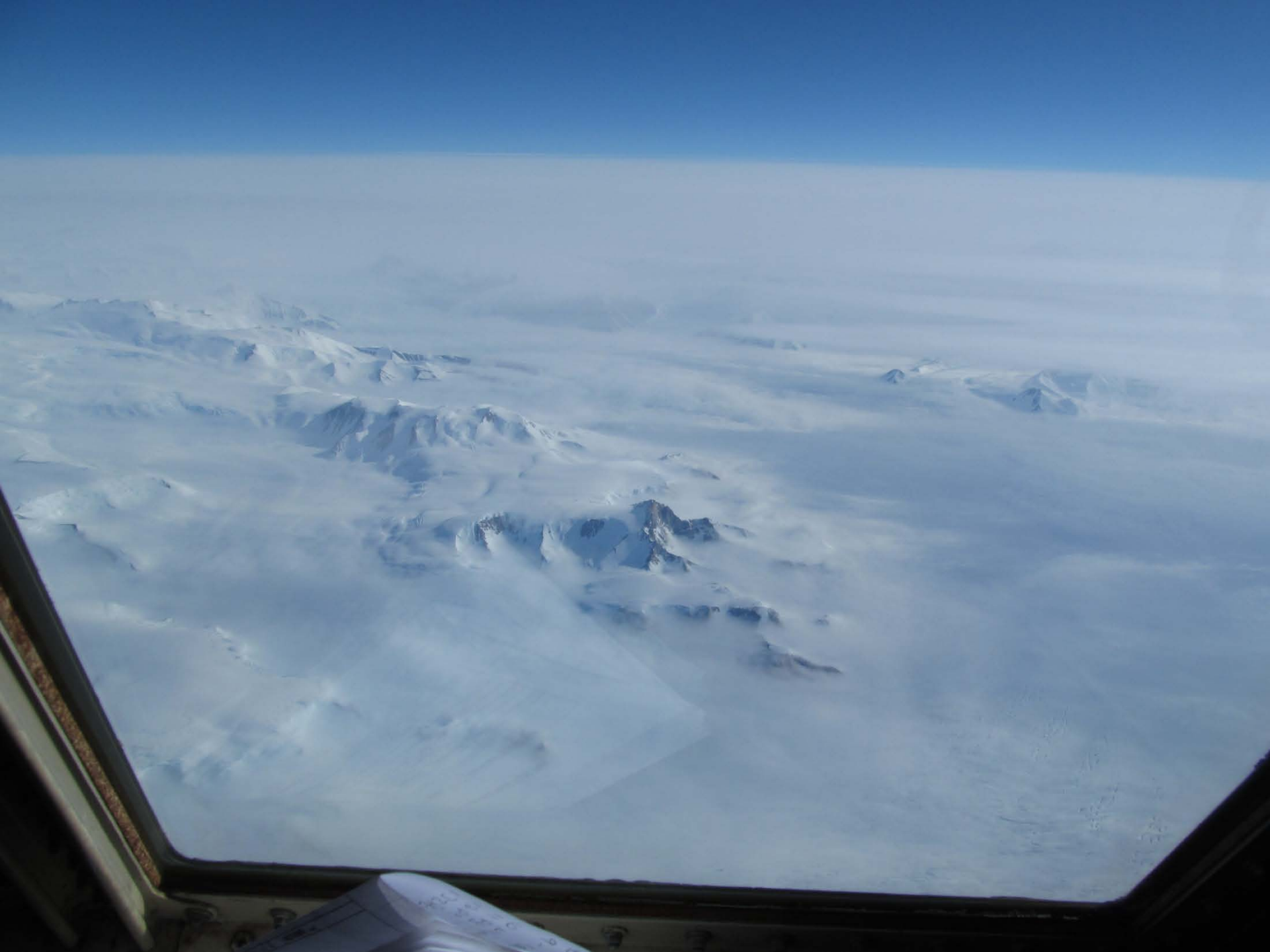
Load for our first flight (750 km from McMurdo):

5,500 kg

35 cubic meters

Two Hercules flights for 8 people for 6 weeks











Scott Tent

2 people plus stove and some storage

Double wall construction

40 kg weight

Ventilated for stove exhaust

Pyramid shape with four aluminum poles

4.3 cubic meters habitable volume (plus vestibule)

2 people can endure at least 13 consecutive tent days

Three additional Scott tents: lavatory; science and team gathering; bath or skidoo repair.

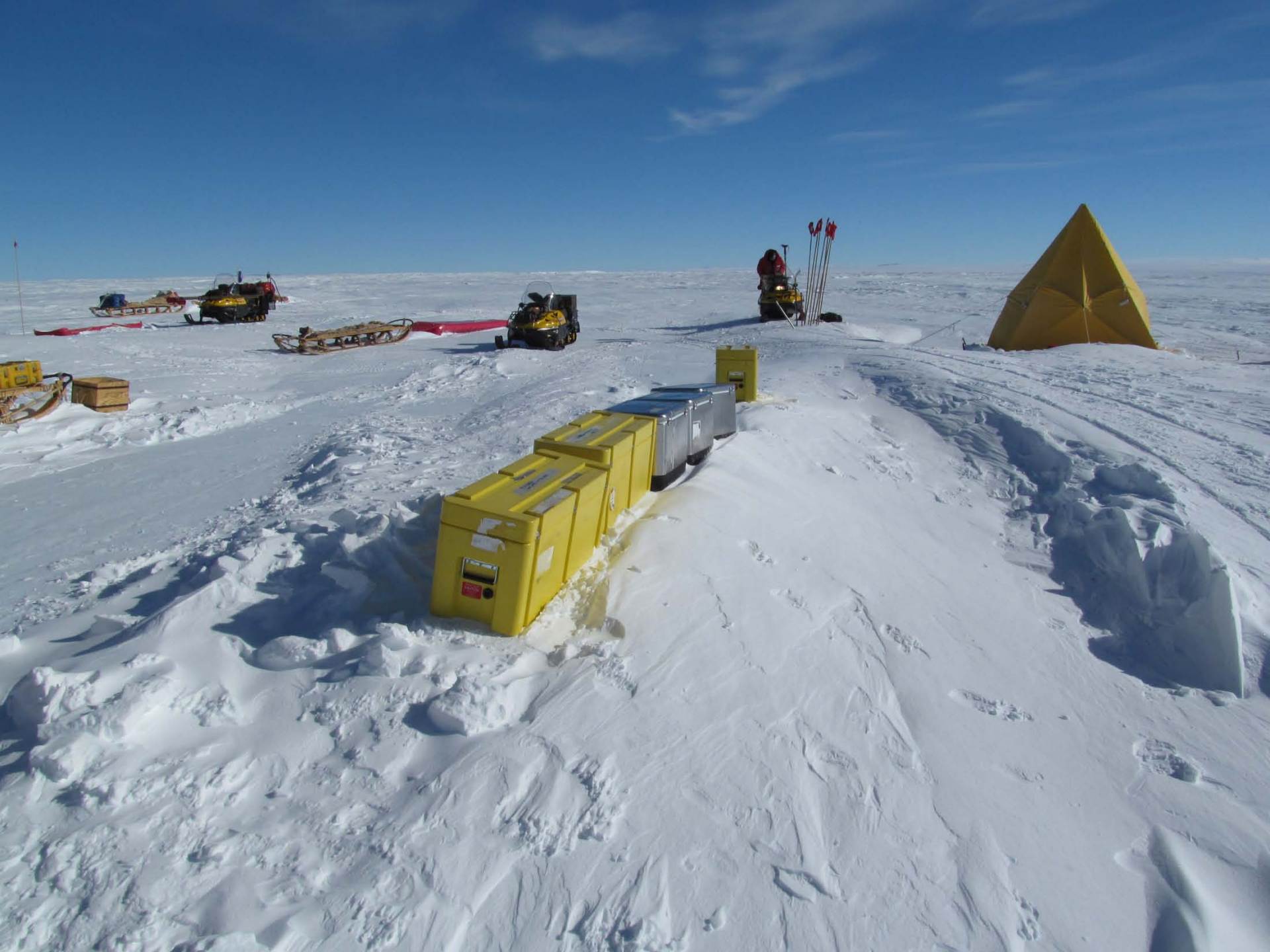


Coleman 2-burner white gas camp stove

Converted for propane fuel

Used for heating, cooking, and melting ice for water.
9 kg of propane gives 9 days of use.





Food for two people for 6 weeks

80 kg

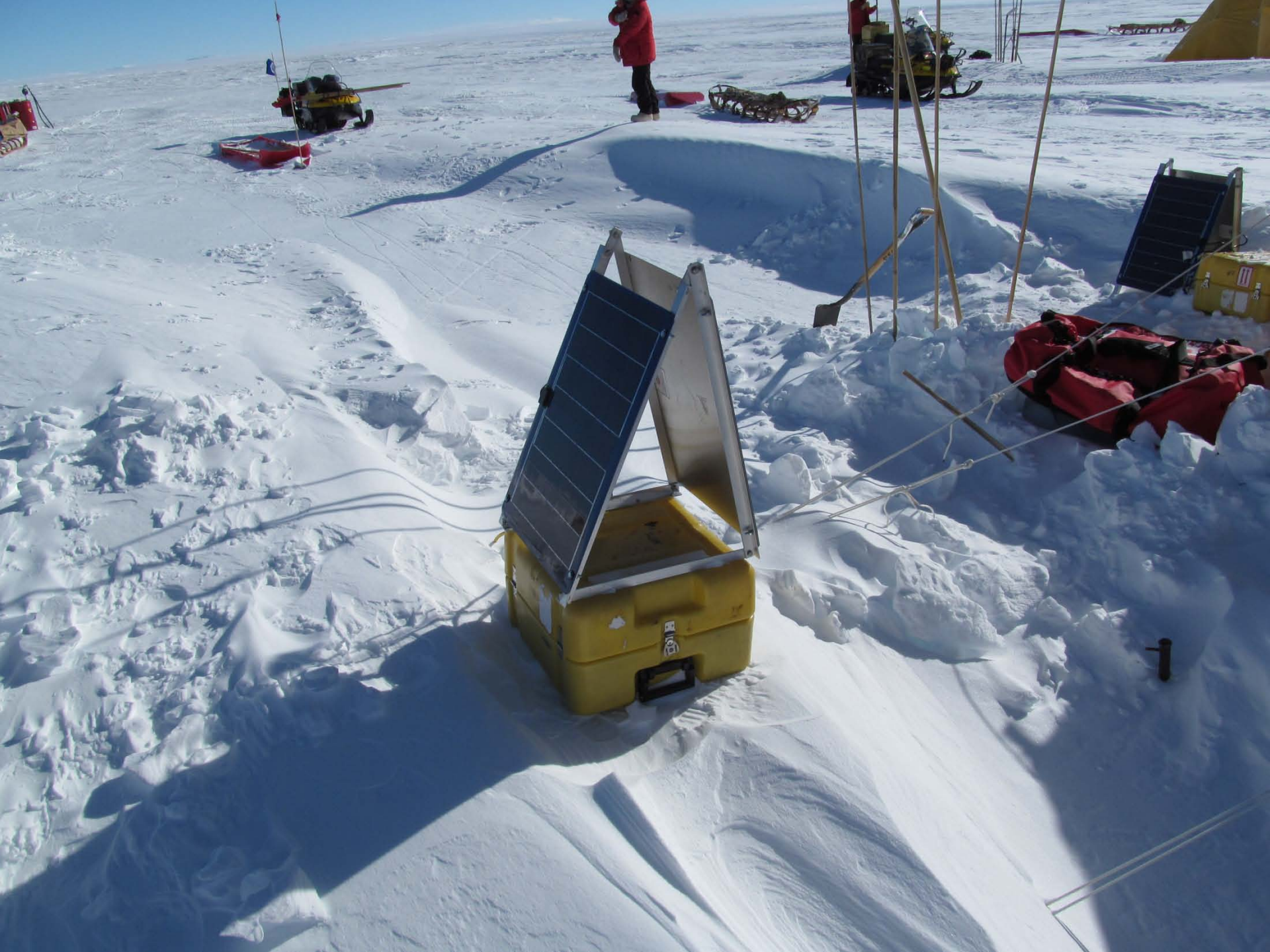
0.5 cubic meters



Water for two people

10-liter bucket full of ice chunks
yields 6 liters of water per day





Solar power unit

Two panels

Two low-temperature auto batteries

Inverter for 110 V 60 Hz power

Power storage and conditioning gear masses 40 kg

35 W max continuous load

5 W average use for power misers



Iridium satellite telephone

6 W draw for charging

8 hours for a full charge

2 hours talk time on a charged battery

3 phones for a party of 8

each phone used 5 minutes to 1 hour per day

Daily check-in calls but no "mission control"



Bombardier "Skandic" Ski-Doo

320 kg weight

Pre-mixed two-stroke engine fuel (40:1 fuel:oil)
delivered in 208-liter drums

36-liter fuel tank, 3 km per liter of fuel (6 mpg)

640 km driven during 6-week season

Fuel use for 8 skidoos for 6 weeks:

2300 liters (640 gal., 3800 lb.)

Daily maintenance: 5 minutes for 1 person

Repairs in field: 32 person-hours

(carburetors, broken spring, broken bracket)





















"Isopod" insulated sample containers

0.2 & 0.15 cubic meters

15 kg empty

140 kg & 45 kg with samples at end of season
(329 meteorites)



Twin Otter aircraft

1,000 kg load for 400-500 km range.



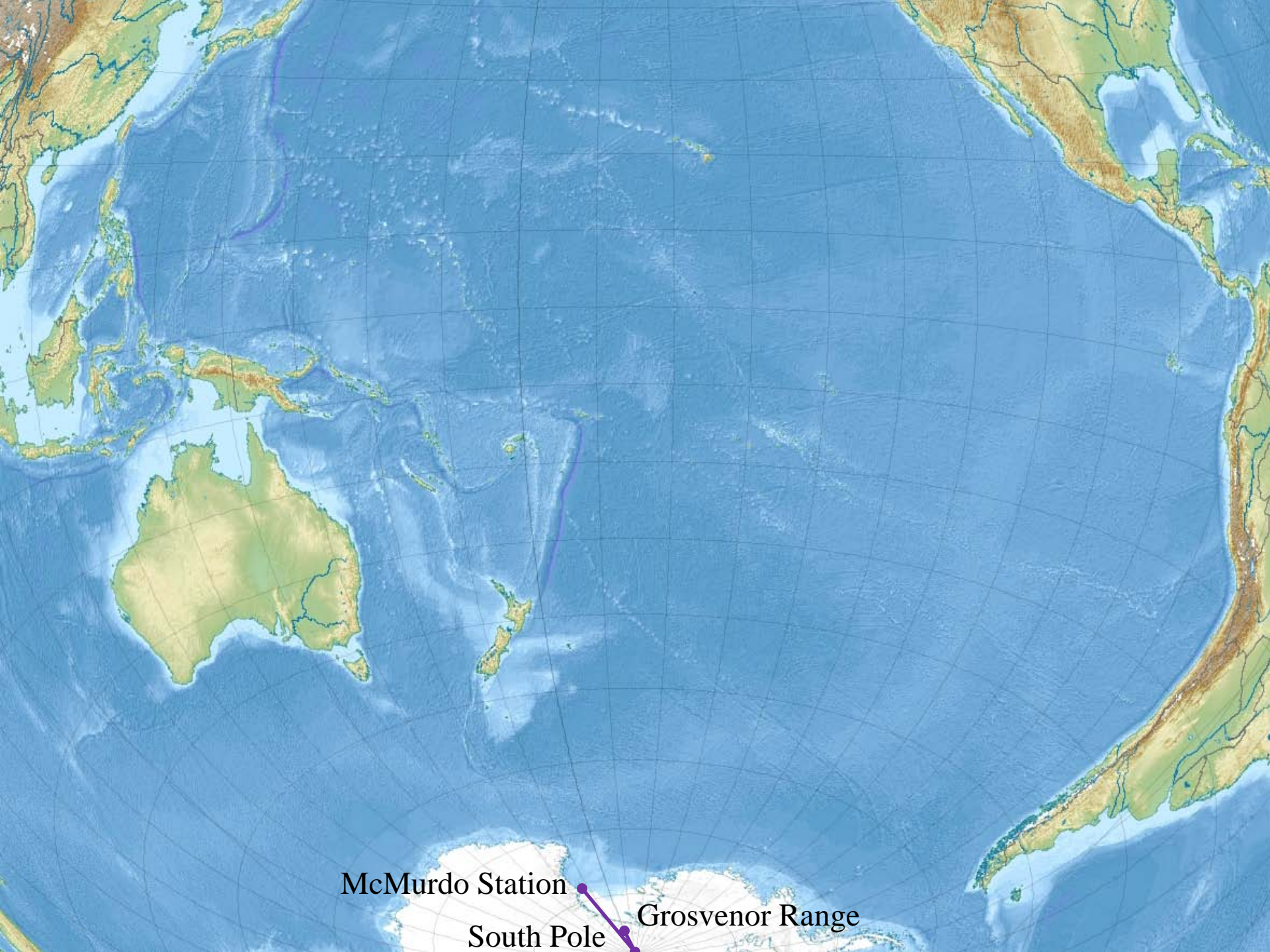












McMurdo Station

South Pole

Grosvenor Range

The United States Antarctic Program
welcomes you to

Amundsen-Scott South Pole Station



90°00' South

established 1957













FOOD WASTE







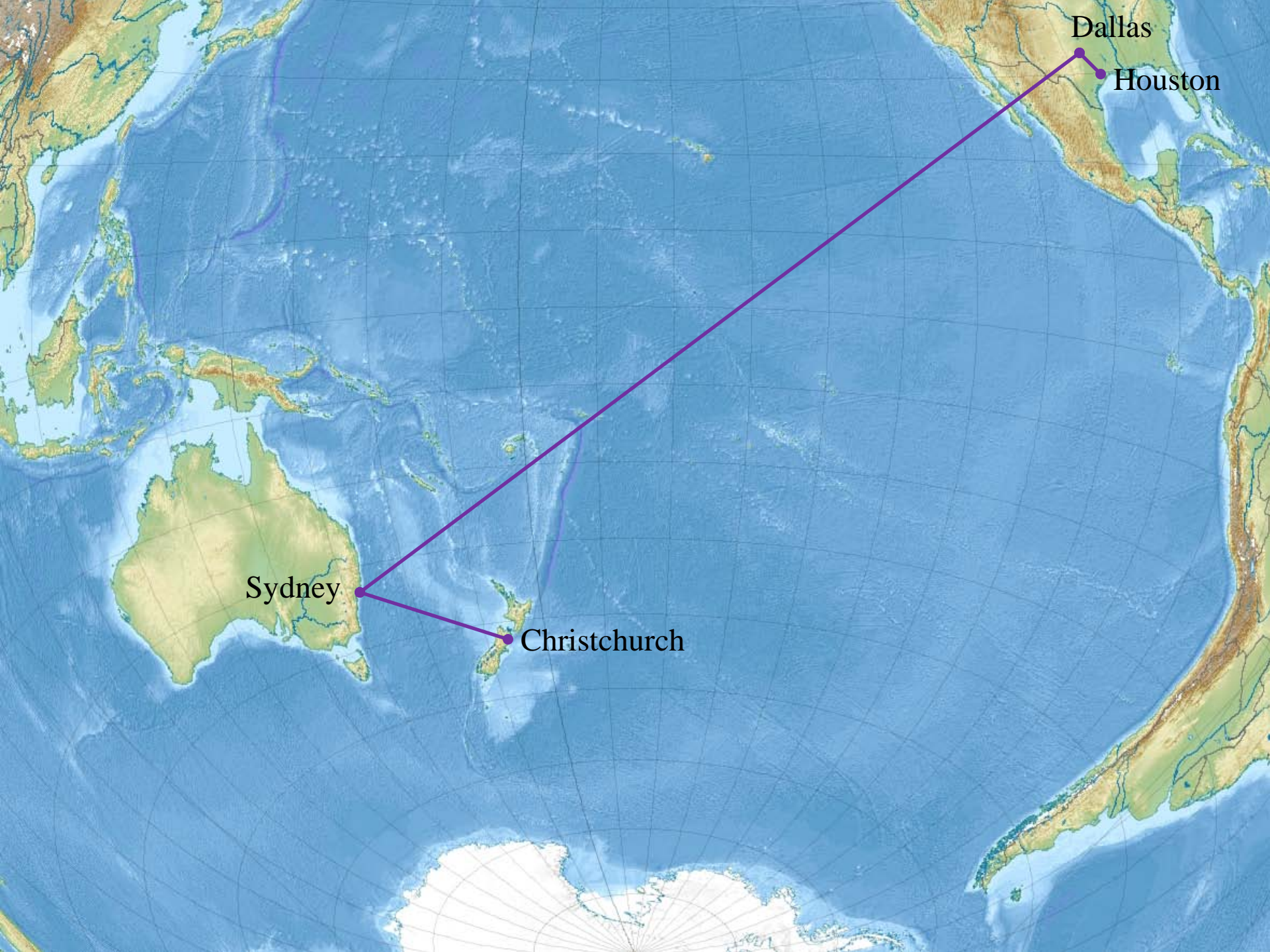
Christchurch

McMurdo Station









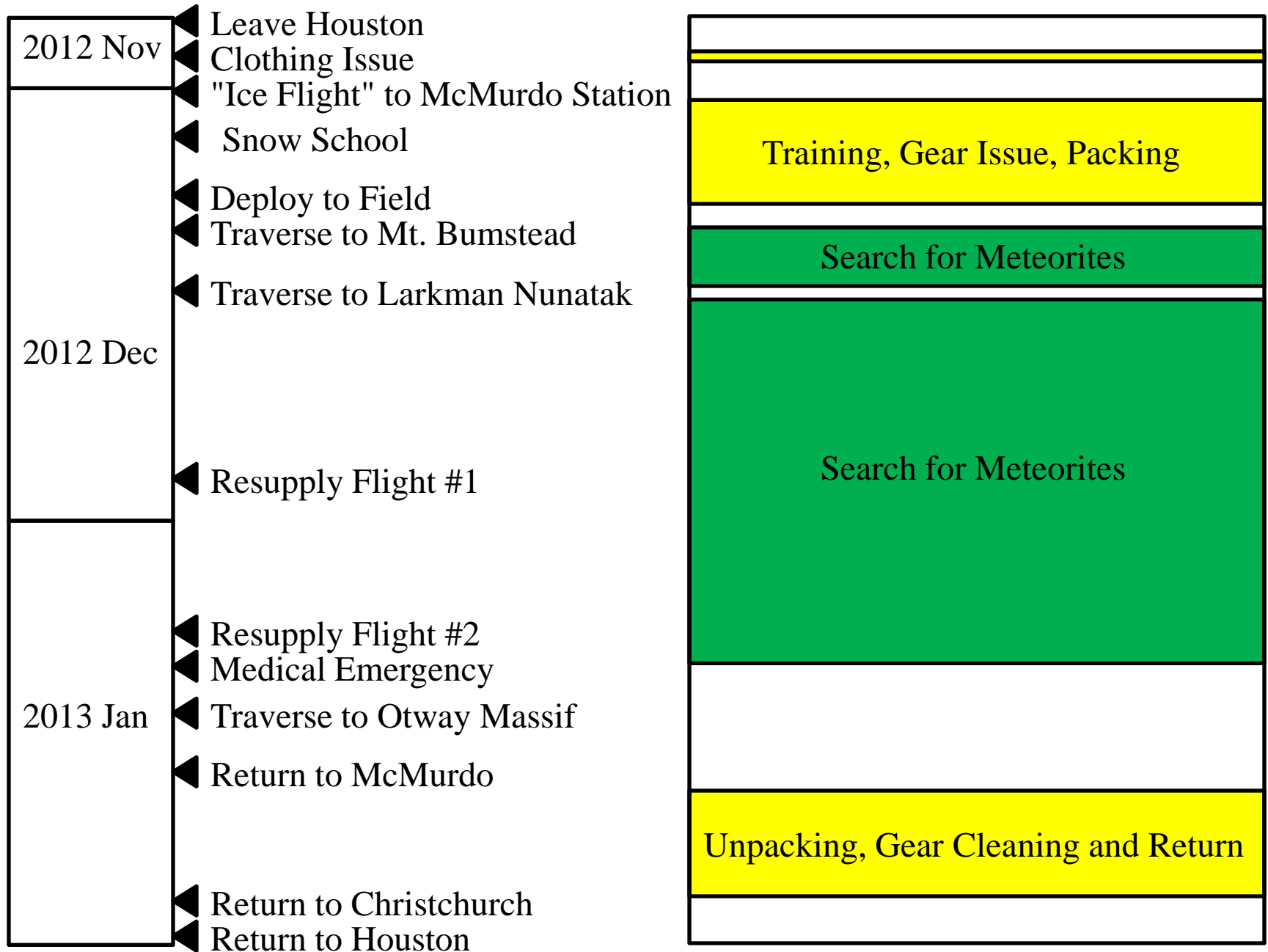
Dallas

Houston

Sydney

Christchurch

Timeline



The End



Los Angeles

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Houston

Sydney

Christchurch

McMurdo Station

Grosvenor Range



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